

Using Volunteers in Groundwater Monitoring and Other Spring Protection Activities in Florida

National Water Monitoring Conference

May 2-6, 2016, Session G6

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AquiferWatch (AW)

- AW – a 501(c)(3) nonprofit organization
 - **1. Educate public about GW**
 - 2. Facilitate “hands-on” education through GW monitoring
 - 3. Produce long-term GW monitoring data
- AW – Cooperates with **FL LAKEWATCH**

AquiferWatch Staff & Affiliations

- Rick Copeland
 - FL. Dept. Environ. Protect (FDEP)
- Gary Maddox
 - FDEP
- George Edwards
 - G.H. Edwards & Associates
- James Hatchitt
 - ARMASI Inc. / Alachua County (FL)
- AW efforts are “on the side”

AquiferWatch

- **Most Emphasis to date** on Volunteer Monitoring of **GW Levels**
- **Recently:** GW Quality Sampling

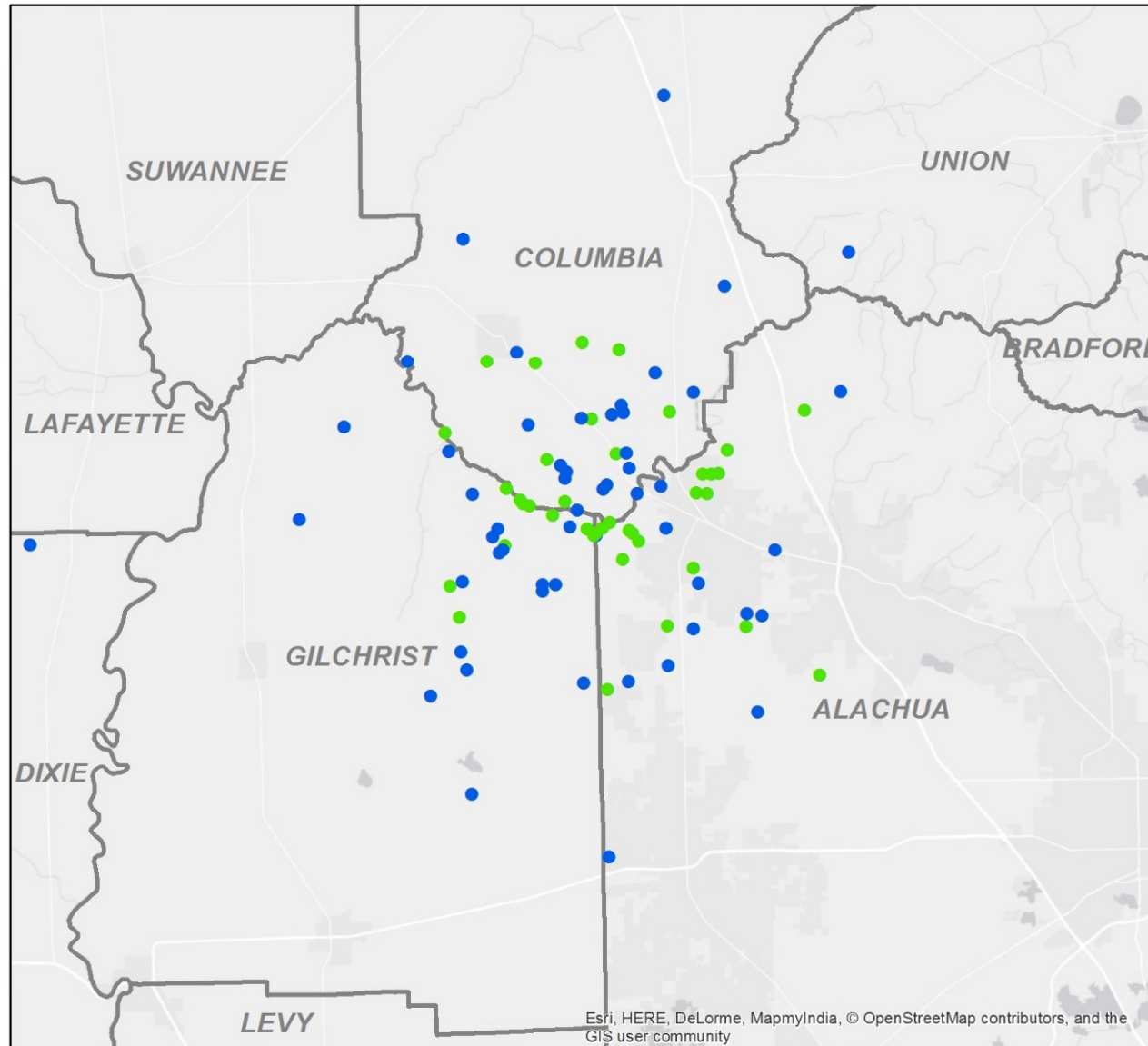
GWL Measurements







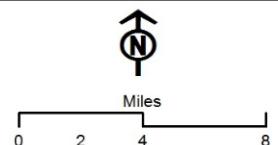
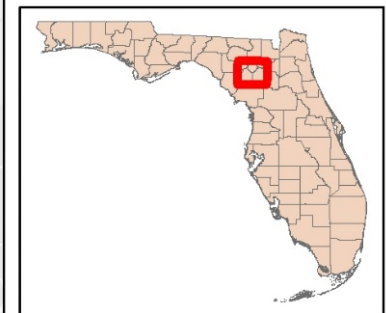
Recently, GW Quality Sampling in the Lower Santa Fe River Basin (LSFRB)



**Locations By
Sampling Agency**

Legend

- Sample Agency**
- Aquifer Watch
 - ACDEP



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LSFRB Nitrate Project

- Cooperative Effort
 - Alachua Co. Environ. Protect Dept.(AC)
 - AquiferWatch Inc. (AW)
 - FL LAKEWATCH (LW)
 - Current Problems Inc. (CP)
 - Our Santa Fe River (OSFR)
- Karst Environmental Services (KES)
- Rum 138
- Extreme Exposure Dive Shop

LSFRB Nitrate Project

- Two Synoptic Sampling Events (**Nitrate**)
Sept, 2014 and May, 2015
- AC: Organized, Planned,
Prepared Final Report
Sampled their monitoring sites
- CP/OSFR/Rum 138: Recruited Volunteers
- KES: Sampled their monitoring sites

LSFRB Nitrate Project

- Upper Floridan Aquifer
- LW: Conducted Laboratory Analyses
- AW: Recruited
Well Reconnaissance
Discussed sampling with volunteers
Coordinated sampling of volunteers

Nitrate, pH, Alk, TP, TN, SC, Cl, PO₄

LSFRB Nitrate Project

- AW conducted field reconnaissance of each volunteer well



LSFRB Nitrate Project

- Well Reconnaissance:
 - Inform well owners about project
 - Obtained well location and construction data
 - Obtained contact information, including email
 - Added FLUWID tag to well
 - Taught volunteers - sampling procedures

LSFRB Nitrate Project



LSFRB Nitrate Project

- AW notified volunteers of dates
 - Volunteers delivered samples to:
 - Karst Environmental Services
 - Extreme Exposure Dive Shop
 - Rum 138
- After all samples collected and delivered to the drop off sites, AW then transported to LW lab
- When lab analysis complete, AW sent results to volunteers



Pros and Cons of Volunteer Monitoring

Cons

- Data from Volunteers not as “good” (poorer quality) relative to professionals
 - **Hoyer et al. (2012)** compared **LW** data to **FDEP**
 - Sampling at 27 lakes
 - Total – N No Significant Diff
 - Chlorophyll a No Significant Diff
 - Total – P Significant Diff (Lab Methods)
 - Secchi Depth No Significant Diff (Unpublished)

Pros

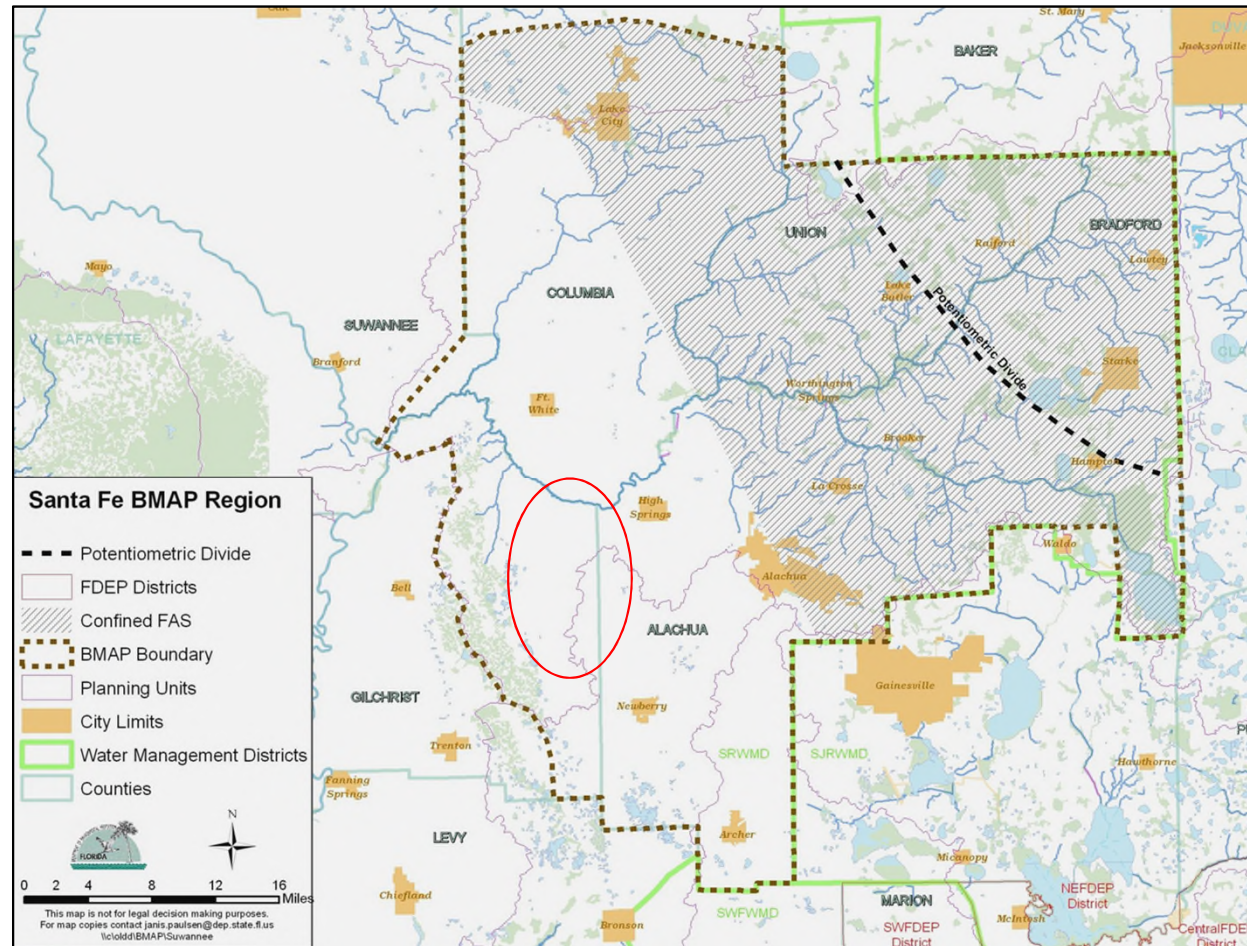
- Govt. saves \$\$
- Volunteers become better educated
- Public becomes better educated
- More and better quality data to use for evaluating conditions of water bodies

Volunteers/Spring Protection: Terms

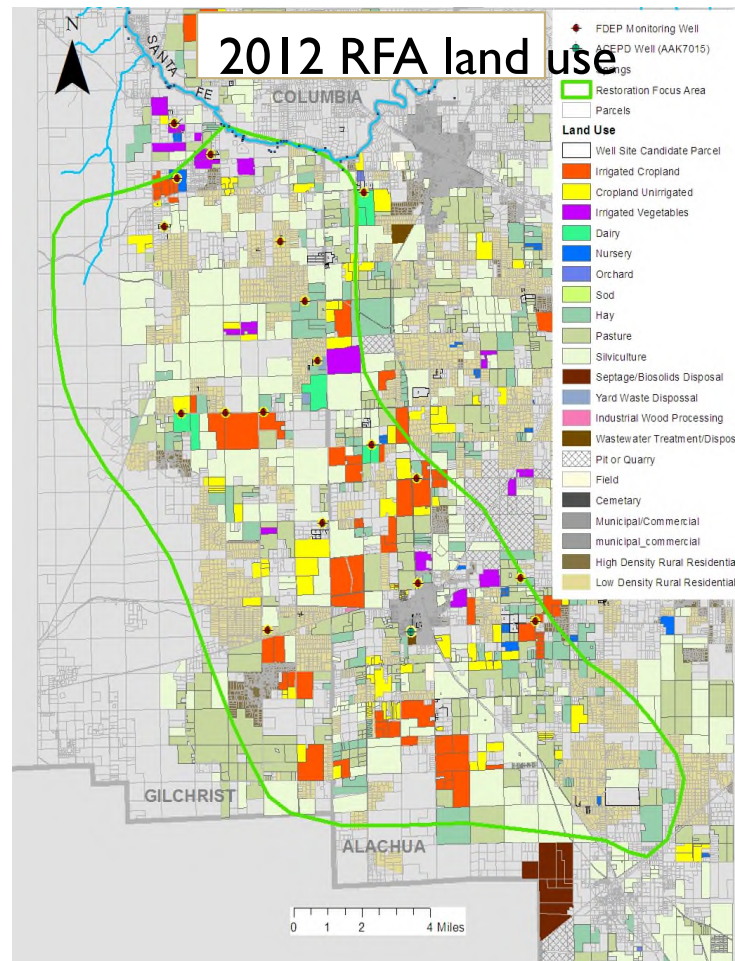
- **Impaired** water body (FDEP)
 - Water body does not meet standards (thresholds to protect)
 - (health, habitat, fishing, and recreation)
- **Once Impaired** – reduce loading to: Max amt. of a pollutant in a water body that can meet water quality standards (**Total Maximum Daily Load (TMDL)**)
- **Basin Management and Action Plan (BMAP)**
 - Blueprint for restoring impaired water bodies (FDEP)
- **Best Management Practices (BMP)**
 - Non-regulatory guidelines for minimizing pollution and conserving water resources

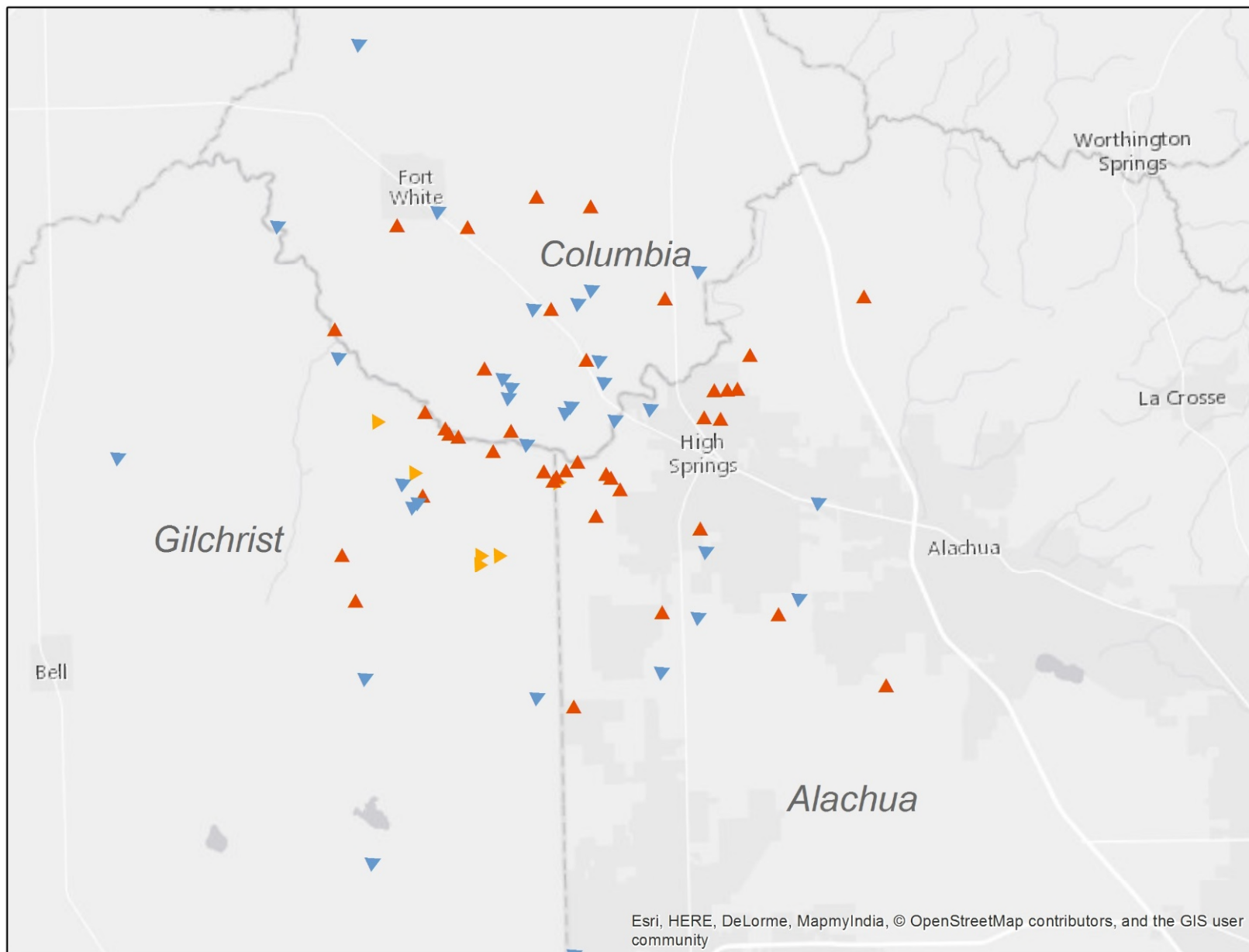


Volunteers and Spring Protection BMAP – Santa Fe Springs Region



Volunteers and Spring Protection BMAP – Restoration Focus Area



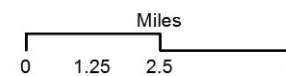


**September 2014
Groundwater Samples
By Sampling Organization
Lower Santa Fe River
Basin Study**

Legend

Sampling Organization

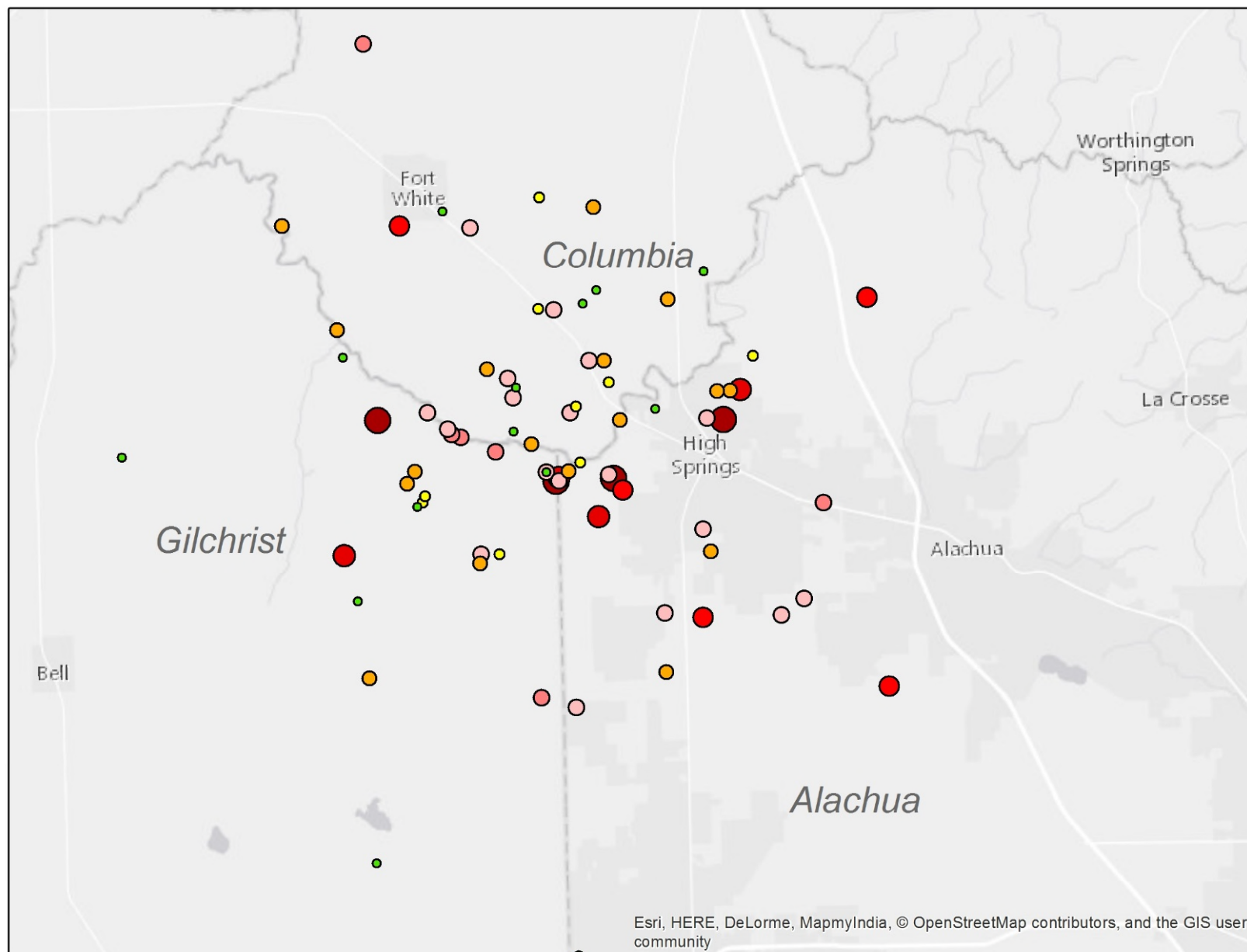
- ▲ ACEPD
- ▼ AW
- ▶ KES



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**September 2014
Groundwater Nitrate
Concentrations
Lower Santa Fe River
Basin Study**



Legend

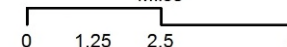
Nitrate mg/L

Result

- 0.01 - 0.1
- 0.11 - 0.35
- 0.36 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 3
- 3.01 - 4
- 4.01 - 8



Miles



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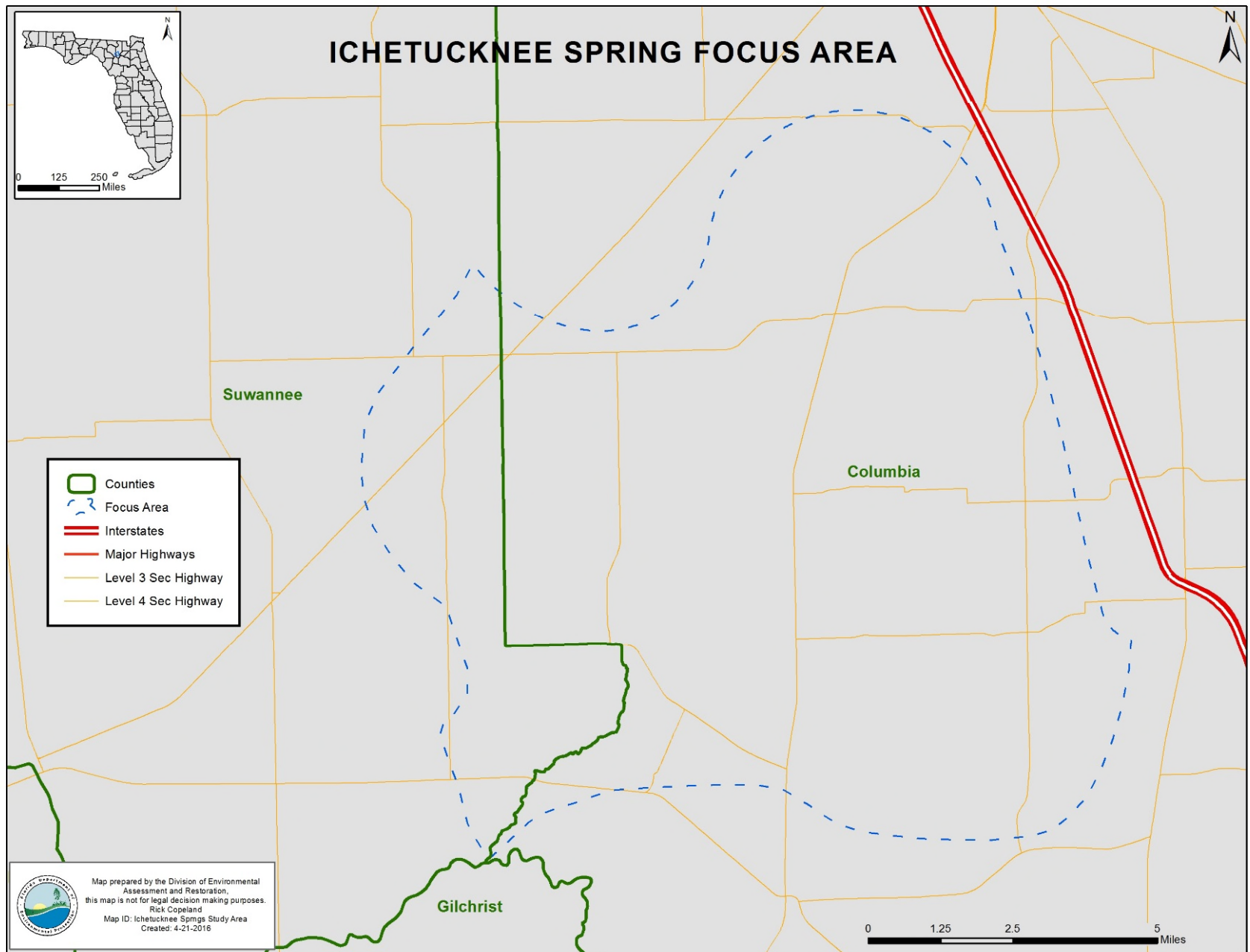
Nitrate ($\text{NO}_2 + \text{NO}_3 - \text{N}$)

- | <u>Org</u> | <u>Samples</u> | <u>Median</u> |
|--------------------|----------------|---------------|
| • AC/KES | 46 | 1.21 |
| • AW (Residential) | 32 | 0.44 |
| • All | 78 | 0.91 |
- AC and KES – multiple well types; some monitoring (**targeted**)
 - Targeted – Could be located near suspected source of pollutants
 - AW – **all residential (private supply) wells**

Lesson Learned

- Using many volunteers to collect GW samples produced unexpected variability
- In the future, AWW restrict sampling to a handful of “trained” volunteer coordinators
- In future only trained (certified) coordinators will collect samples from the wells of the volunteers
- Goal - To be certified by FDEP

Ichetucknee Springs Basin and Focus Area



Ichetucknee Springs Basin

Professional and Volunteer Activities

- Monitor Upper Floridan aquifer in Ichetucknee Basin
 - Determine baseline conditions
 - Measure changes over time
- **FDEP**: ID Focus Area, construct monitoring wells \approx 12
- In addition, conduct private well **volunteer** monitoring program
 - **FDEP** and **volunteers**: monitor **N & P species**, and **Cl**

Additional Potential Volunteer Activities in Ichetucknee Spring Basin

- Assist in educating public about BMPs
 - BMAP process needs to get the word out
 - Volunteers can distribute pamphlets
 - Non-commercial agriculture
 - Volunteers can inform citizens about methods to minimize impacts of non-commercial agricultural land use activities

More Lessons Learned

- Volunteers have great potential to conduct a number of tasks, in addition to monitoring GW samples
- Be realistic about the time required operate a volunteer GW monitoring program
- Be persistent and committed



- **Questions?**
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